

The Wild Format guides are intended to expand awareness and understanding of the craziness that can be created on wide format digital printing devices, from floors to lampshades and everything in between.

These guides are made possible by a group of manufacturers working together with Digital Dots. We hope you enjoy the articles and that you put into practise what you learn. If you want to talk about it, go to our LinkedIn group at <http://linkedin/1pkeLH1>

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Textile printing basics

Digital print technologies support very rapid design changes and makes it possible to produce very short run productions, also for textiles. Since the digital printer used also can act as the proofing device there shouldn't be any difference between the proof and the final print.

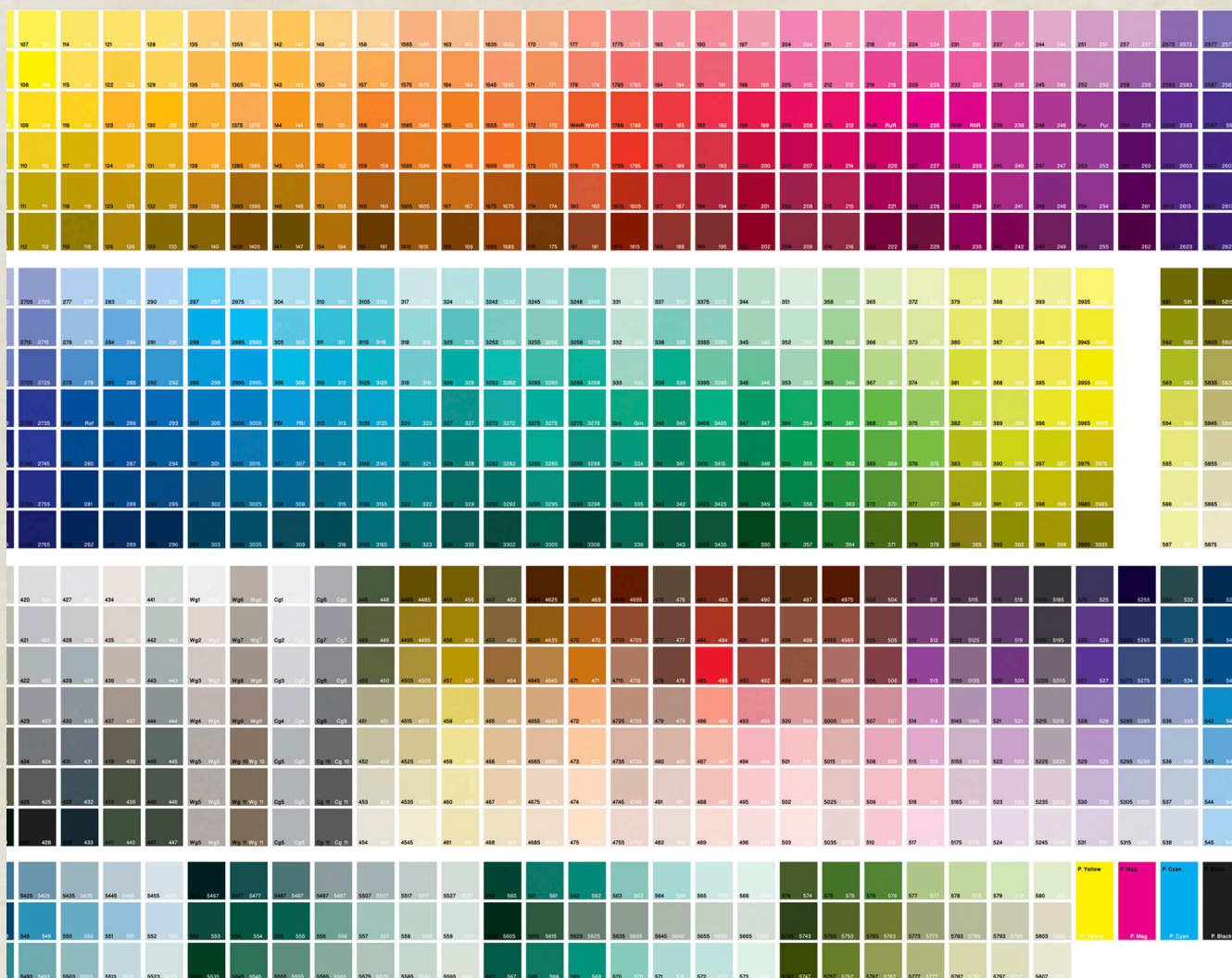
Conventional screen printing still dominates when it comes to printing large volumes of textiles. But digital printing technologies are being developed fast for these types of applications. This is especially true for short run bespoke production of custom textiles. And there is so much more to Digital Textile Printing (DTP) than printing on clothes, T-shirts and other garments. What used to be printed on vinyl for example, such as banners, is more and more frequently printed on textiles to reduce costs and weight.

Plan your production carefully

Not all types of inks will work on every type of substrate, and very few printing devices can easily switch between one type of ink and another. This means that you need to cooperate closely with your print service provider when you plan your production. Make sure you have fully understood which type of ink will work with the type of fabric

you intend to use. Sometimes additional steps are required before the actual printing starts, such as pre-coating or priming of the material. During the print there might be additional steps and operations besides applying the ink, like removing dust and/or lint from the fabric. The same goes for post-press operations. Some types of fabrics need to be washed and dried, and another post-printing process could be stentering, stretching the fabric back to the intended dimensions and proportions. Your print service provider will know about all this, but it will help you to understand what adds costs and time for different types of production when you plan your textile print project.

If you care about colours being reproduced as expected, and who doesn't want the colours to be right, you should invest in a high-end monitor and learn how to calibrate it using a colorimeter or spectrophotometer. This will help you predict how colours will appear in print, since not all colours in the RGB colour space can be converted to CMYK, the normal colour space for print. The same is true for special colours like spot colours. Only about 65% of for example the popular spot colours from the Pantone library will be rendered colour accurately in a typical CMYK colour space. If you need a very wide colour gamut you need to check with your



Every combination of ink and substrate has some limits in terms of colour gamut. Make sure you know if the colour you hope to achieve is within the gamut of the device that will be used, for example by having a colour sample printed using the exact same ink and substrate used for your project. This colour sample is provided by the English printing service Digetex.

print service provider what ink setups their textile printers use. If they use an extended ink setup, for example adding Orange, Green and Violet to the standard process colours CMYK (Cyan, Magenta Yellow and Black), then suddenly you have access to almost the full gamut of RGB as well as about 99% of the spot colours.

If you are restricted to CMYK only then ask for a colour sample printed on the substrate

you intend to use, so you can check if you will get the actual colour you expect. A more advanced way, and this is where you'll need a calibrated monitor, is to ask for the ICC-profile relevant for the substrate, and activate this in your design software for soft proofing. The ICC-profile represents the colour characteristics of the printing system, ink, substrate and printing device, and is used for colour management in the prepress department of your print service provider.

But if you are knowledgeable in applied colour management you will also benefit from having access to this colour profile.

One of the great advantages of digital printing is variable data production, which can open up all sorts of possibilities for customised textile printing. It is entirely possible to produce such work, but it needs some experience and systems support in terms of database management so factor this into your planning.

Use the relevant software fit for purpose

The Adobe Creative Suite, of late renamed to Adobe CC (Creative Cloud) is by far the most commonly used tool for creative design and artwork production. For pixel-based images Photoshop is used, while vector graphics (sometimes called line art) is created and edited in Adobe Illustrator. You can use Illustrator to create artwork which combines both pixel graphics, vector graphics and text, while others prefer to make more complex designs in Adobe InDesign. There are many more apps in Adobe CC, but the ones mentioned above will most likely be more than enough for you to complete the artwork. They all support applied colour management, so if you activate the relevant ICC-profile in the colour settings you will be able to preview the artwork with accuracy, provided you

work on a good and colour calibrated monitor.

If you can't afford to pay the licenses for the Adobe CC apps that you need, there are in fact some reasonably good free apps for both pixel based images and photos, as well as free apps for vector graphic based illustrations. For pixel-based images you can try Gimp, available for Mac OS, Windows and Linux. For vector graphics you can try Inkscape, also available for Mac OS X, Windows and Linux.

Independent of which software you use you should always check with your print service provider what types of file formats they prefer the artwork to be delivered in, but also things like image resolution needed, which colour space they prefer (CMYK or RGB, or if they accepts colour specifications as named spot colours).

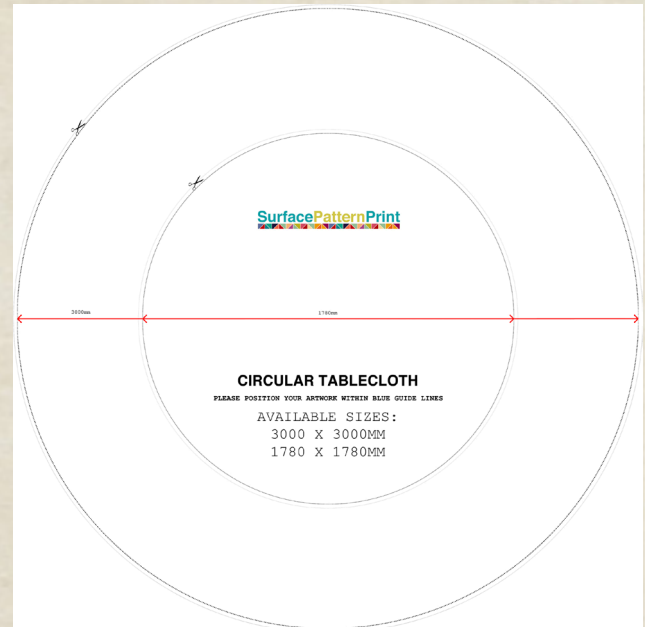
Don't forget health and safety and other quality factors

When planning the production you probably have the substrate as the starting point, and this will narrow down your options in terms of what types of inks and devices you can use. In other cases environmental considerations, such as energy requirements or recyclability, might influence your choice of both ink and

substrate. Yet another factor that should be part of planning what type of substrate to use is health and safety.

When printing on substrates intended to be used for indoor decorations, and also garments for that matter, it's important to check the fire- or flame resistance rating (sometimes called fire retardancy) of the substrate, to ensure that the fabric isn't flammable. In this context it's worth mentioning that one application of digital printing is to apply one or more types of coating which will enhance the characteristics of the substrate. It's possible to apply so called functional coatings, like dirt- and water repellent coating, a fire retardant coating, a UV-block or an electrically conductive coating. Other examples of functional coatings for garment are antimicrobial-, anti-fungal and anti-insect coatings (insect repellent).

Another consideration for the final printed product is its durability, both waterfastness, rub resistance and lightfastness, especially resistance to UV light. Garments are expected to be washable, so the question then will be at what temperature, or if they need to be dry cleaned. Sport garments might be among the most demanding applications to tackle, so factors like humidity and perspiration fastness should be added to your list. For banners and soft



If you plan to sell customised digitally printed textiles from your web site make sure you have both design guides and sample templates to make it easy for your customers to get started. The tablecloth template shown here is from the company Surface Pattern Print, a sub division of the printing service Digetex.

signage, the key question to ask is where they will be placed: indoor or outdoor, where outdoor usage of course puts greater demands on light- and Ozone fastness.

Printing on polyester, or polyester based fabrics with other types of fibres mixed in, is perhaps one of the most popular substrates in DTP. There are many types of polyester-based textile substrates, and generally they perform well in the printing process in that they don't stretch or skew.

Another classic fabric is cellulose based, like cotton and linen. While popular for garments, they might need to be printed with reactive dyes to be durable, and so

typically need post printing processes like steaming (in order to fix the ink), washing and drying.

Other natural substrates are protein-based fibres, like wool and silk. As with cotton and linen, the printing process typically needs to be coupled with post print processes like steaming and washing, and perhaps also pre-print coating treatment.

Polyamide is a synthetic fabric popular in many types of sportswear, not least in swimwear. This might be the most challenging type of textile in DTP, because of the demands on durability and colour fastness. But there are solutions where digital printers use acid dyes, and have inline pre-coating and infra-red drying.

Match substrate and ink

There are a wide range of types of inks suitable for textile printing, and they can be split into several categories, depending on what solvent is used, what the colourant is (dye or pigment), and how the ink is transferred onto the substrate.

Dye inks can be reactive dye inks suitable for cotton and cotton/polyester blends. Dye based ink is generally considered to offer a large colour gamut, that is, vibrant colours. Reactive dye inks typically offer good water- and lightfastness. Acid dye is

mainly used when printing on silk. Disperse dye is suitable to use when printing on polyester. Dye sublimation printers for textiles typically use a water-based ink printed onto a transfer material. The image is transferred onto the fabric using heat and pressure, where the dye turns into gas and permeates the fibres in the fabric. This process also fixes the image onto the substrate. Generally, the print is considered to be durable, not prone to peel off or fade, at least not if the fabrics contains mostly polyester, and not too much cotton. The image quality is close to photo realistic.

Water-based pigmented inks can be used to print directly onto cotton and other types of fabric, and also be used when using a transfer material. They have a lot in common with conventional flexo inks, but the ink layer is generally controlled better in a digital printer than in a conventional screen printing press. Water-based ink typically allows what is often called “the soft hand” feel of the printed fabric, meaning that the image is fused into the fabric and not applied only on the surface.

Among the pigment-based inks, UV curable inks are gaining popularity, including printing with white ink. This is because these inks are instantly cured, so no post treatment is required. But this doesn't mean that UV curable ink is suitable for all types of

applications, limitations in stretchability and the look and feel might not appeal for all types of fabric.

Another possible advantage for digital is that in many cases it uses less energy because it relies on fewer processes than for example conventional screen printing. It can also require less water in the washing processes, if and when they are needed. All in all digital textile printing offers the potential of a more sustainable and more environmentally friendly production.

– **Paul Lindström**

The Digital Dots team specialises in consulting and editorial for digital prepress, printing and publishing technologies. This includes research, testing, evaluation and content services for publishers, printers and print buyers.

This third Wild Format Series is the latest in a long line of educational projects for graphic arts professionals, including designers and content originators. We also publish <http://spindrift.click>, a subscriber supported premium content website with readers all over the world and a sharp focus on technology.

We work on various ISO committees developing standards for print production and the environment, and we are accredited auditors for ISO 12647-2 and ISO 9001 in the UK and Sweden. You can find out more about us at <http://digitaldots.org>.